



Allosuckling and daytime nursing pattern in farmed Red deer *Cervus elaphus*

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Allosuckling and adoption of young have been described for a number of social animals (RIEDMANN 1982; PACKER et al. 1992). In farm animals, 'undesirable' adoption of young, 'mismothering', 'steeling' or 'poaching' of alien young are all terms used to describe these phenomena. They have been observed in sheep (WELCH and KILGOUR 1970) and cattle (EDWARDS and BROOM 1982; EDWARDS 1983). Literature reports on mother behaviour in ungulates (ARMAN 1974; ALEXANDER and STEVENS 1982) describe repeated nursing and massaging the ano-genital region of an alien calf by a female as a possible indication of bonding. Nursing of their own and alien calves together by a female indicates probable parasitism of an alien offspring or cooperation between related individuals (RIEDMANN 1982; PACKER et al. 1992; BIRGERSSON et al. 1991). KELLY and DREW (1976) observed red deer in a farming situation. They observed calf sucklings of an alien hind to be very rare (2.7%), and were always quickly terminated when the hind paid no attention to the strange calf.

It is generally understood that allosuckling and adoption are more likely to occur when many pregnant females are living together around parturition, which is often the case on farms. Rare cases of allosuckling (BUBENIK 1965) were also reported for free living red deer. Although mismothering in farmed red deer is common knowledge among farmers (PEMBERTON 1987), the development of this undesirable mother-alien calf bonding is not well understood.

The aim of this study was to determine (i) whether allosuckling occurs on the farm under observation, (ii) whether massaging the ano-genital region of an alien calf by a female could be regarded as a reliable indication that adoption had occurred, and finally (iii) whether there is a pattern to the time and/or frequency of day-time nursing.

The study took place in a 4 ha enclosure of a red deer *Cervus elaphus* farm at Vimperk, South Bohemia, Czech Republic, where 42 pregnant hinds with collars and 5 yearlings were kept. A total of 31 calves was born during the period of observation. Ten of them were collared within one day post partum.

The observations took place from a high seat in the centre of the enclosure. The observation was carried out between the 6th and the 28th of June from 6:00 to 21:00. Altogether the observation consisted of 152 hours, including four subsequent days of nearly continuous monitoring within the above-mentioned time range, during the peak period of activity. Each nursing event was recorded, together with the identity of the animals involved.

A total of 754 nursings of either one or more calves was recorded. Eight hinds nursed an alien calf in 18 different suckling events (2.4%). These hinds nursed the alien calf either alone ($n = 11$), or together with their own young ($n = 7$). Our results did not support KELLY and DREW's (1976) suggestion that in farmed red deer allosuckling occurs

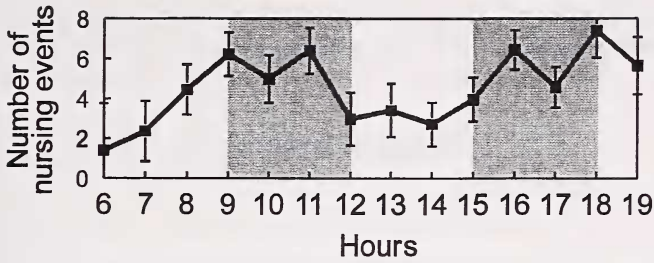


Fig. 1. The distribution of recorded nursings during the day is shown. The grey columns are selected periods for further investigation

when the deer are not accustomed to man. Although the incidence of allosuckling observed here was comparable to KELLY and DREW'S (1976) results, the deer in this study were mostly tame. Our results, however, correspond well with reports on fallow deer (BIRGERSSON et al. 1991; BIRGERSSON and EKVALL 1994).

On 11 different occasions, four hinds licked the alien calves ano-genital region during nursing. Two of these hinds nursed an alien calf only a few hours after giving birth. We had presumed that licking of the ano-genital region of the suckling calf by an alien hind indicated an adoption. To our surprise, however, two hinds were licking and massaging the ano-genital region of up to six different calves. Thus, to identify mismothering by a single observation of massaging the ano-genital region by an alien hind appears unreliable, and instead, detailed and continual observation over a long period is required.

Nursing data were subjected to the General Linear Models Procedure (GML) for Unbalanced ANOVA (SAS). Classes were 'Days' (17 days of observation) and 'Hours' (6:00 to 20:00). Least-squares means (LSMEAN) were calculated for each class and differences between classes were tested by t-test. The distribution of recorded sucklings during the day is shown in figure 1. The GML model was significant ($F_{(29,147)} = 2.03$, $P < 0.01$). While "days" of observation were very variable ($F_{(16,147)} = 2.32$, $P < 0.01$), the fluctuation of nursings during the day appeared almost non-significant ("hours" $F_{(13,147)} = 1.76$, $P = 0.06$). No precisely defined peaks of nursing activity were visible. For further investigation we selected the periods between 9:00 and 12:00 and between 15:00 and 19:00, which showed higher incidence of nursing. The high activity after 19:00 had to be omitted because of decreasing visibility due to approaching darkness. These selected periods covered most of the nursings observed (GLM model for selected and non selected periods $F_{(1,147)} = 8.24$, $P < 0.01$, figure 2). Our data on nursing activity agree with findings on the related fallow

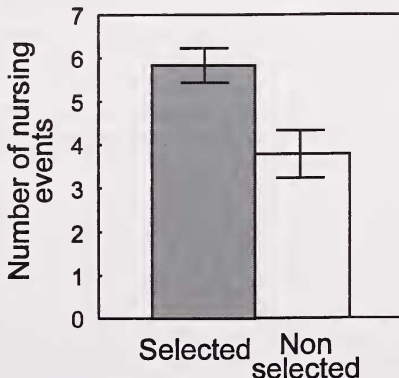


Fig. 2. Number of nursing events during selected and nonselected periods.

deer, where authors found no remarkable diurnal cycles of the nursing (BIRGERSSON and EKVALL 1994). KELLY and DREW (1976) observed a pattern of nursing activity peaking in the early morning and evening and also with a higher incidence of nursing around 10.00 h, on red deer farm.

In conclusion, in contrast to our expectations, massaging of the ano-genital region of an alien calf by a female cannot be regarded as an indication of the establishment of a hind-calf bond in farmed red deer.

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References

- ALEXANDER, G.; STEVENS, D. (1982): Odour cues to maternal recognition of lambs: an investigation of some possible sources. *Appl. Anim. Ethol.* **9**, 165–175.
- ARMAN, P. (1974): A note on parturition and maternal behaviour in captive red deer (*Cervus elaphus* L.). *J. Reprod. Fert.* **37**, 87–90.
- BIRGERSSON, B.; EKVALL, K. (1994): Suckling time and fawn growth in fallow deer (*Dama dama*). *J. Zool. (London)* **232**, 641–650.
- BIRGERSSON, B.; EKVALL, K.; TEMRIN, H. (1991): Allosuckling in fallow deer, *Dama-dama*. *Anim. Behav.* **42**, 326–327.
- BUBENIK, A. B. (1965): Beitrag zur Geburtskunde und zu den Mutter-Kind-Beziehungen des Reh- (*Capreolus capreolus* L.) und Rotwildes (*Cervus elaphus* L.). *Z. Säugetierkunde* **30**, 65–128.
- EDWARDS, S. A. (1983): The behaviour of dairy cows and their newborn calves in individual or group housing. *Appl. Anim. Ethol.* **10**, 191–198.
- EDWARDS, S. A.; BROOM, D. M. (1982): Behavioural interactions of dairy cows with their newborn calves and the effects of parity. *Anim. Behav.* **30**, 525–535.
- KELLY, R. W.; DREW, K. R. (1976): Shelter seeking and sucking behaviour of the red deer calf (*Cervus elaphus*) in a farmed situation. *Appl. Anim. Ethol.* **2**, 101–111.
- PACKER, C.; LEWIS, S.; PUSEY, A. (1992): A comparative analysis of nonoffspring nursing. *Anim. Behav.* **43**, 265–281.
- PEMBERTON, J. M. (1987): Fallow genetics. *The Deer Farmer*. Dec., 17–20.
- RIEDMANN, M. L. (1982): The evolution of alloparental care and adoption in mammals and birds. *Quart. Rev. Biol.* **57**, 405–435.
- WELCH, R. A. S.; KILGOUR, R. (1970): Mismothering among Romneys. *New Zealand Agriculture* **121**, 26–27.

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